SANGITA V.. VADYALAYA..ES : VOL. I, .. 1.

SRUTI VĀDYAS

(DRONES)

BY

PROF. P. SAMBAMOORTHY, B. A., B. L.
Honorary Director

ALL INDIA HANDICRAFTS BOARD
NEW DELHI

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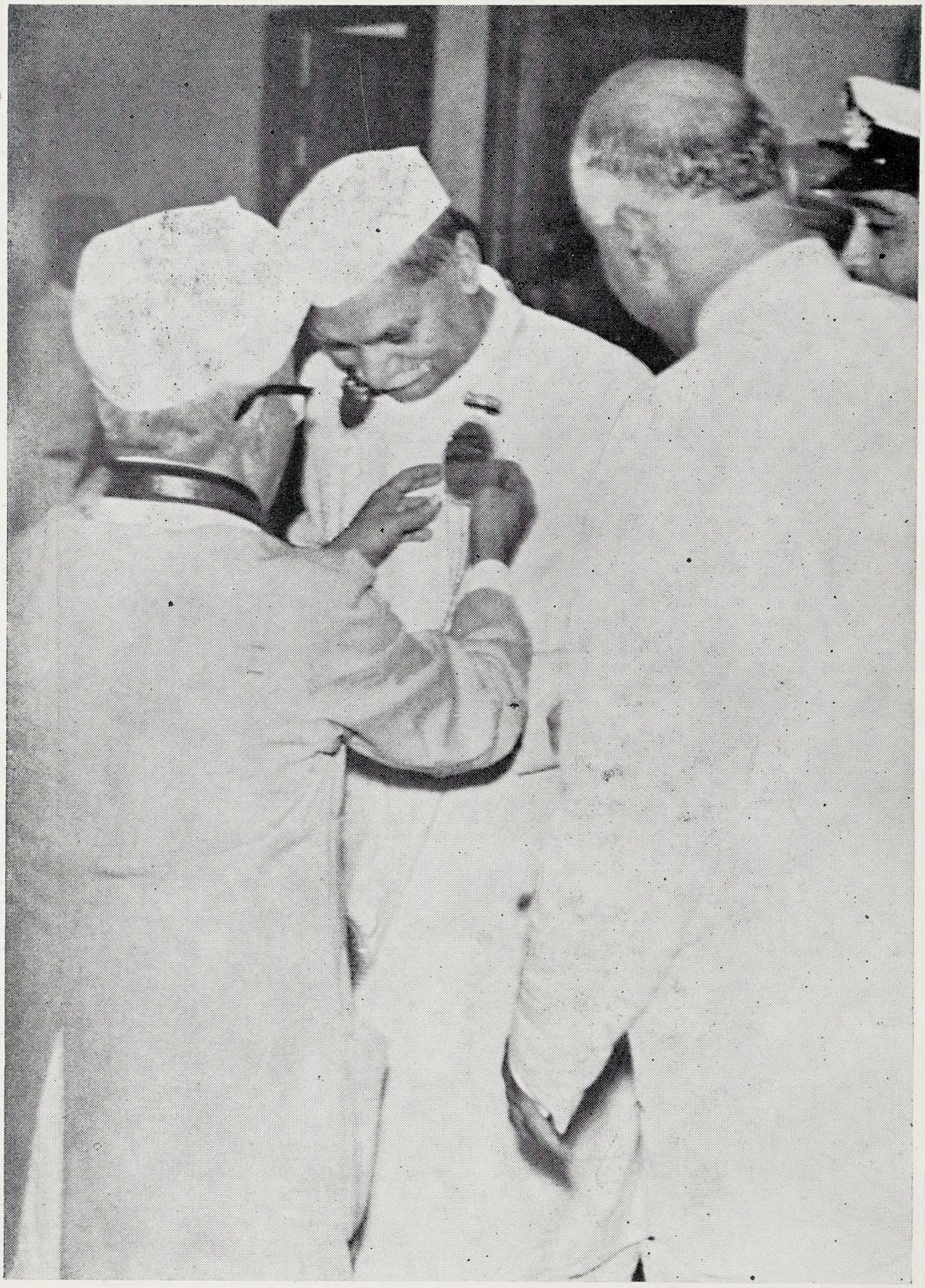
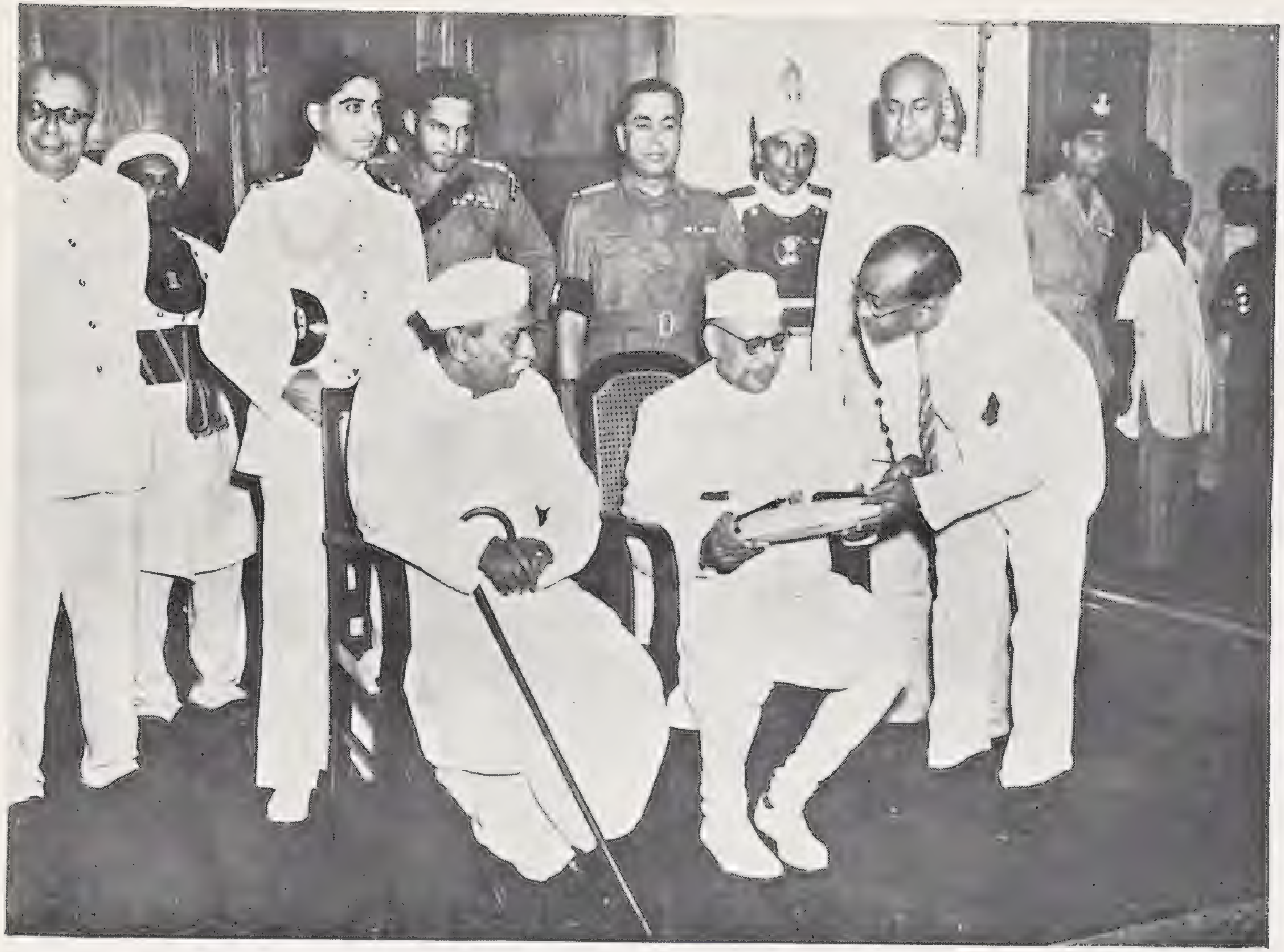
The Honorary Director playing on the Bambolin (Bamboo Violin) at the Inaugural function of the Sangita Vadyalaya on February 16th 1956. H. E. Shri Sri Prakasa the Governor of Madras and Shrimati Kamaladevi Chattopadhaya *Chairman*, All India Handicrafts Board can be seen in the picture.



The Honorary Director after garlanding
the Rashtrapati, Dr. Rajendra Prasad on the occasion of
his visit to the Sangita Vadyalaya on 13th August 1956,
explains to him how miniature musical instruments
have been woven into the special garland.

THE RASHTRAPATI, DR. RAJENDRA PRASAD
at the Sangita Vadyalaya
on the 13th Aug. 1956.

The Honorary Director explains to Dr. Rajendra Prasad the construction of the seven-stringed tambura.



The Rashtrapati, Dr. Rajendra Prasad and H. E. Shri Sri Prakasa, Governor of Madras, being shown a violin manufactured in the Sangita Vadyalaya on the 13th August 1956.

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FOREWORD

Professor Sambamurti's book on the Drones is in a way the fascinating story of how man first drew pleasing notes out of a taut wire and thus created the instrument for making music. Starting with a single string, which is still with us and popular too, our people in this couutry went on to multiple strings that could breathe a much richer resonance and become today an indispensable part of Indian music. The drone provides the background and tone to our music, particulary vocal music

In tracing the beginnings and the evolution of the drones from the earliest times, Professor Sambamurti has made a very valuable and original contribution to the understanding of Indian music. I am sure that this book will open one more window on the knowledge of Indian music. Incidentally it also makes us keenly aware of how very old our music is and how far it goes back into the dim past, lit by contributions such as this, to guide us to its sources.

The All India Handicrafts Board is happy and deems it a privilege to present this book through the Sangita Vadyalaya of which Professor Sambamurti has been the moving spirit and guide and hopes that it will stimulate greater interest not only amongst scholars but equally amongst the public in the origin and evolution of Indian music, of which the drones undoubtedly form the precious core.

NEW DELHI :
February 24, 1957.

Kamaladevi Chattopadhyay.

PREFACE

For the first time, a book dealing exhaustively with the subject of "Sruti Vadyas" is placed before the public. The subsequent volumes in this Series will deal with the musical instruments belonging to the Stringed, Wind and Percussion groups.

The varieties of tambura and other drones as also their origin and development are treated of in this book. The different systems of tuning adopted, when two tamburas are used are also described.

The Svavadita tambura developed in the Sangita Vadyalaya is of interest from the point of view of Instrumentation. This instrument played automatically by an electric motor fixed inside the body of the stem can be used both on the concert platform and in the music class room. Once the instrument is tuned and kept in the correct posture and switched on, it will continue to give a steady and faithful performance for hours together. This instrument may be put in action even some ten minutes before the actual commencement of a concert. Not only will the audience get attuned to the coming music, but the atmosphere of the auditorium will also get saturated with the sruti' svaras. The needed musical atmosphere will thus be created and the performer will feel a certain freedom at the commencement of the concert itself. In places where electricity is not available, the svavadita tambura can be used like an ordinary tambura.

I am thankful to Shrimati Kamaladevi Chattopadhyay, Chairman of the All India Handicrafts Board, for having contributed a Foreword to this book.

25th February 1957. THE AUTHOR.

SANGITA VADYALAYA - A SHORT NOTE

This is the first Institution of its kind, to be started by the All India Handicrafts Board, functioning under the Ministry of Production, Government of India.

The Sangita Vadyalaya has four sections :—

(i) The Musical Instruments Workshop wherein students are given training in the making of musical instruments, their parts, accessories and cases. The workshop is equipped with the necessary work benches, machines, tools and instruments.

(ii) The Gallery of Musical Instruments wherein 150 musical instruments, mostly of India and a few of foreign countries are kept. The instruments in the Gallery are kept in a form fit for being taken and played upon at any time.

The instruments in the Gallery serve as a Reference collection to the Trainees undergoing the course in musical instruments making. The Public are also allowed to see the gallery.

(iii) The Library which contains a collection of books on musical instruments, making of musical instruments, their parts and accessories and the carrying out of repairs to musical instruments.

(iv) The Research section, wherein experiments in (a) New types of resonant wood (b) Making of new musical instruments (c) Improving the quality of existing instruments and (d) the reviving of obsolete instruments are carried on.

On the theoretical side, trainees are given lectures on the systems of classification of musical instruments, the structure and construction of musical instruments, materials used in their manufacture, types of resonent wood, seasoning of wood and other topics pertaining to instrumentation. The trainees sketch the figures of musical instruments and their parts in their Drawing notebooks. They are also given training in playing on two concert instruments of their choice.

SRUTI VADYAS
(DRONES)

CHAPTER I

INTRODUCTION

Sruti vadyas are musical instruments used for sounding the key-note or the tonic note. The key-note is the Ādhara (basic) shadja chosen by the singer or the performer on an instrument. Although the sounding of this single note provides sufficient guidance to the singer and the instrumentalist, still for the sake of tonal richness, notes which blend with the adhara shadja are also sounded. Thus instruments giving madhya sthayi shadja, madhya sthayi panchama and tara shadja, or mandra sthayi shadja, mandra sthayi panchama and madhya sthayi shadja are used. It may be pointed out that the panchama is the samvadi svara or the consonantal note of *sa* and that the octave *sa* and octave *pa* are respectively the second and the third harmonics (svayambhu svaras) and blend well with shadja.

In India as well as in countries wherein the melodic system of music prevails, the singer is at liberty to choose the pitch most suited to his voice. He usually chooses that note as his sruti which enables him to sing without effort half an octave lower down and one and a half octaves higher up. In the harmonic system of music, this freedom is denied to a singer. He has to sing the music in the key or pitch in which it is written. An instrumentalist, in the countries wherein the melodic system of music prevails has likewise, the liberty to tune his instrument to any pitch he likes and perform. A player on Vina or Gotuvadyam may tune his instrument to any convenient pitch and perform. Of course he will use strings which

will delightfully respond to the chosen pitch. If he is an accompanist, he has to tune his instrument to the pitch of his Principal, i. e., the principal performer. But in the west, the instrumentalist has to play the music in the pitch or key in which it is written.

With the tonal background of sruti, the individuality of a raga is revealed well. The melodic entity of a raga is maintained only when the frequencies of its notes conform to the prescribed relationships to the fundamental. Of course it is possible for a person to enjoy and identify a raga even when performed without a drone accompaniment. In such cases the inter-relationships of notes entering in the formation of the raga, immediately suggest the tonic note. But the ideal is to perform music along with a drone accompaniment. In India, the drone is kept sounding right through a concert. Instead of the drone giving rise to a feeling of monotony, it provides a pleasing background to the music and greatly enhances its effect.

Drones are indispensable in all those countries, which use a variety of scales. In countries which use a few scales, there is no necessity for a drone. Drones have no place in harmonic, contrapuntal and polyphonic systems of music.

Drones help a singer to start singing on the precise pitch. From experience, a singer finds out the pitch most suited to his voice and accordingly tunes the tambura or other drone to that pitch. In the absence of a drone, there is no guarantee that he will start singing each time on the same pitch. Human voice is a highly sensitive instrument and it responds delightfully, only when it is made to sing at the pitch most suited to it. The ringing character of many a voice has been damaged by choosing pitches which the voices could not negotiate with ease. A certain pain will be felt in the larynx and in the head, if the voice is compelled to sing at a pitch higher or lower than its normal pitch.

CLASSIFICATION

Drones may be classified into :—

1. (a) *Stringed drones*:- These are drones belonging to the class of stringed instruments. Examples are Tambura, Ektar, Dotar, Tuntina and Sur sota.

These instruments are played on open strings.

(*b*) *Wind drones* :- These are drones belonging to the class of wind instruments. Examples are Ottu, Ottu sangu, Sruti upānga or Titti and Sruti box.

(*c*) *Percussion drones:*— These are drones belonging to the class of percussion instruments. Examples are Edakka and the Musical Stone Pillar of the Sruti Sthamba type. In Malabar temples, the Edakka is just adjusted by the grip of the left-hand to the tonic note of the singer and the songs sung. The Sruti Sthamba is just struck with a thin stick and played.

II (*a*) *Manually played drones*. i. e., Drones played by human effort like the Tambura, Ottu, Sruti Box ; and

(*b*) *Automatically played drones* i. e., drones played mechanically and without human effort as the *Svavādita tambura* or the Automatic Electric Tambura.

III (a) *Single note drones*. These are drones which are designed to give only one note (the adhara shadja), as in the instances of Ektar, Tuntina and Ottu. In some drones, the single note given may be the octave shadja as in the bag pipe drone and in the drones used in the Himalayan regions.

(b) *Plural note drones*. These are designed to give more than one note. The notes given may be two, as in Dotar, four as in Tambura and seven as in the Saptatantri (seven-stringed) Tambura used by Shatkala Govinda Marar (19th cent.) and eight, when Jodi (two) tamburas are used.

The plural note drones admit of the divisions :—

(a) Simultaneously sounded as in the sruti box.

(b) Successively sounded as in the Tambura

IV. *(a) Monophonous drones :–* On these instruments only one note can be heard at a time as in the Tambura. Herein the strings are plucked successively.

(b) Polyphonous drones : On these drones two or more notes can be heard simultaneously. Sruti Box is a good example.

V. (a) *Independent drones :* These are distinct drone instruments and do not from an integral part of some other instrument. Examples are Tambura and Ottu.

(b) *Auxiliary drones*, i. e., Concert Instruments with the drone coupling. These are drones which form part and parcel of a concert instrument. The drone-cum-tala strings in the Vina, Gotu–vadyam and Pradarsana Vina form an integral part of the respective instruments. The drone pipe in the Magudi forms an integral part of the Magudi.

VI. (a) Instruments designed to be used only as drones ; and

(b) Instruments which are designed to be used as drones and time-keeping instruments

Tambura can be used only as a drone. But the *Gettu vadyam* and *Edakka* can be used as drone–cum–rhythmic accompaniments.

VII. *Drones used singly and drones used in pairs.* Ottu and Sruti-box are used singly. Two tamburas are used in concerts frequently.

VIII. *Stationary and Portable.* The musical stone pillars designed to give the tonic note are examples of stationary drones. These pillars support the roof like the other pillars in temples. Tambura is an example of a portable drone.

IX. *Drones provided with sympathetic strings and drones without sympathetic strings.* The tambura has no sympathetic strings but the Sur sota is provided with sympathetic strings.

X. *Drones with derivative names and Drones for whose names no reason can be assigned.* For example, Ektar derives its name from the fact that it is a single-stringed instrument. This is a mono-chord. Ekanadam, another name for Ektar suggests that the instrument gives a single sound. Likewise Dotar is so named because it has two strings. The name Tambura was given because of its use by the Sage Tumburu. The fact that Tumba (gourd) was first used as the resonator for the instrument might also have resulted in the name Tambura.

But the name Tuntina does not suggest any particular origin.

XI. *Drones of alterable pitch and Drones of fixed pitch* Stringed drones provide instances of sruti vadyas of alterable pitch. Herein the strings may be tuned to notes extending over a compass of two tones taking into consideration the gauge numbers of the strings used.

In the sruti box, the reeds give a fixed pitch. If a higher or lower sruti is desired, another sruti box giving the required pitch has to be requisitioned. Once the sruti box is made, the question of adjusting the instrument to another pitch does not arise. In the sruti sthambha also, the sruti is determined when it is sculptured.

In a single-stringed drone (Ekatantri) the string is just tuned to the tonic note of the performer and played. In stringed drones with more than one string, as Dotar and Tambura, the strings are tuned to the sruti svaras, shadja and panchama.

XII. Aerophonic (wind) drones admit of two divisions:

(a) Where the wind is supplied by the performer as in the Ottu and Masaka titti.

(b) Where the wind is supplied by a mechanical contrivance, as the bellows. Ex. Sruti box.

TUNING FACILITIES

In chordophonic drones, facilities for tuning the strings accurately are provided. Whereas the major adjustment is done by turning the pegs, the subtle and accurate adjustments are made by resorting to the beads threaded on the strings near the attachment. By moving the beads towards the attachment or in the reverse direction, the pitch of the string is increased or decreased. The phenomenon of sympathetic vibration helps in cross verification of pitch. The upper partial (antara gandhara i. e., the fifth harmonic) when heard on the Tambura, ensures that the instrument is in perfect tune.

The professional mendicants who go about the country telling stories on sacred and secular themes for the entertainment of the rural folk use a bag-pipe drone. The mendicant first blows air into the pipe and swells the bag. When fully swollen, he closes the mouth-end with the thumb of his left hand and by applying a steady pressure to the bag by his left arm, he allows the air to escape through the reed pipe and sounds the drone note in the process. As the note is heard, he goes on with his musical discourse for a minute or two. When the bag has contracted to its minimum size, he again blows air into it till it is fully swollen and resumes his musical discourse. Thus, while the bag-pipe drone is heard continuously, the musical discourse is given in an intermittent manner, the time during stops being taken for re-filling the bag through blowing. The short spell of time in between the discourses serves to make the audience recapitulate and digest what has preceded and helps them to follow the subsequent part of the story intelligently.

The drone started with folk music. The villager with his uncultivated voice felt the need for the guidance of a drone. The simple Ektar and Tuntina came in handy for the purpose. The materials used in the construction of these instruments are those which are locally available.

CHAPTER II.

ORIGIN AND EVOLUTION

Drones were not used during the Vedic period. The leader started a hymn and the rest joined him. The Rig-vedic hymns were sung to the three notes Udatta, Anudatta and Svarita. (Hymns sung to the music of the Udatta, Anudatta and Svarita svaras can still be heard during the Araiyar gānam in Srirangam and during the recital of the Suprabhatam in Tirupati). During the progress of the chant, the initial pitch was raised a Fourth higher, i. e., to the Suddha madhyama and the hymns were sung in the new pitch. Still later, the pitch was raised a major tone i. e., to the Fifth above the starting pitch and the hymns sung. The madhyama and panchama are the samvadis or consonantal notes of shadja and thus there is an aesthetic principle underlying this change over to the new pitches. This practice of singing to a Fourth higher and Fifth higher in the course of the Vedic chant has persisted even to this day. This practice in singing, rules out the possibility of any drone having been used during the Vedic period. The use of a drone carries with it the implication that the music was sung to the same pitch right through a concert or recital.

With the advent of the Sāma saptaka, the fundamental pitch assumed special significance. The tetrachords above and below *sa* were symmetrical and a single string drone was possibly used as a help. Since the compass of the Sama gana covered a range of seven notes, the changing over to a new pitch for the sake of effect was not felt. The sama-gana scale was a descending scale: *m g r s ṇ ḍ p.* This scale paved the way for the emergence of Shadja grama, the primordial scale of Indian music. This was an ascending scale with shadja as the tonic note.

The recognition of shadja as the tonic note constitutes an important landmark in the history of Indian Music.

In the history of world music, the Indian solfa system is the earliest. The solfa syllables *sa ri ga ma pa dha ni* are found in such an early work as the Narada *Parivrājaka Upanishad* (Upadesa I).

A point of interest in the music of the ancient period is the mention of the value of the 7 notes in terms of their relationships to the immediate lower note. Thus the values of the seven notes of the Shadja grama are given as 4 3 2 4 4 3 2 and the values of the Suddha mela of ancient Tamil music as 4 4 3 2 4 3 2. In the shadja grama, the interval between *sa* and the lower octave *ni* was four srutis or a Chatussruti (9/8)—(8/9×9/8=1); the interval between *ri* and *sa* was three srutis or a Trisruti (10/9)—(1×10/9=10/9); the interval between *ga* and *ri* was two srutis or a Dvisruti (16/15) (10/9×16/15=32/27); the interval between *ma* and *ga* was four srutis or a chatussruti (9/8)–32/27×9/8=4/3 and so on. In modern times, we put the *sa* at the zero point and mention the frequencies of the notes figuring in the Sankarabharana scale as :—

s	r	g	m	p	d	n	ṡ
0	4	7	9	13	17	20	22
1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{27}{16}$	$\frac{15}{8}$	2

There is a misconception in the minds of some that all knowledge relating to frequencies of notes was obtained from the West. One has only to read carefully the Dhruva vina-Chala vina experiment described by Bharata in his *Natya sastra*. That experiment is sufficient to reveal what a clear grasp our ancients had of the values of all minute musical intervals and intervals which really mattered in music. Further there is a very clear indication in our ancient works on music that the octave bore the *dvigunatva* relationship, i. e, the frequency of a higher octave note was twice the frequency of the corresponding middle octave note. If a stretched string is damped exactly at its middle point

and both the segmented lengths plucked, the octave *sa* will be heard from both the parts. If a stretched string is damped at 2/3 length and the two segmented lengths plucked, the note given by the 2/3 length will be found to be the Panchama of the middle octave, and the note given by the 1/3 length, the Panchama of the higher octave. This is again *dvigunatva* and the frequency of Panchama was found as 3/2 of *sa*. Now Panchama was the starting point and the cycle of fifths was worked out. The frequencies of all the notes that figure in music were found out.

The Yazh or the harp was the principal accompaniment to vocal music in ancient times. The harp was tuned to the fundamental scale, either the Shadja grama (Kāfi thāt) or its Madhyama murchchana, *i. e.*, the modern Harikambhoji (Khamaj thāt). When other scales had to be played, the tonic note was shifted to the particular string of the harp and played. It may be pointed out that during the time of the *Tevaram*, the notes of the Suddha mela bore the sruti values 4 4 3 2 4 3 2. This corresponds to the modern Harikambhoji scale. An analysis of the Pans of the *Tevaram* reveals the fact that a good number of the Pans belong to this scale or to its (*a*) madhyama murchchana, Sankarabharana and (*b*) Panchama murchchana, Kharaharapriya. The hymns of Appar were sung in Harikambhoji. The Pans : Gandhara Panchamam (Kedaragaula), Takkesi (Kambhoji), Andalikkurinji (Sama) and Sevvazhi (Yadukulakambhoji) are derivatives of the Harikambhoji mela. The Pan Senturutti (Madhyamavati) is a derivative of Kharaharapriya which is the Panchama murchchana of the suddha mela, Harikambhoji. The Pans, Kolli (Navaroj), Megharagakkurinji (Nilambari) and Pazhampanjuram (Sankarabharana) belong to the Sankarabharana mela. An interesting point about the hymns in the Pans of the Sankarabharana and its derivatives is that the compass of the music does not exceed the tara shadja. This is in perfect accord with the fact that the above pans were played with the madhyama

string of the Yazh as the tonic note. The Mohana Raga in which the *Tiruvachagam* of Manickavasagar was sung belongs to the Harikambhoji scale. There is no evidence that there was a separate drone accompaniment provided when Tirujnanasambandar sang his celebrated hymns.

The Madhyama and Panchama murchchanas of the suddha mela figuring as parent scales in the Pans of the Tevaram, have their counterpart in the singing of the Vedic hymns a fourth higher and a fifth higher sometime after the commencement.

The four-stringed drone appears for the first time in classical music in the post-Tevaram period *i. e.,* after the 9th century. When the concept of raga-alapana emerged, the singer felt the necessity for a separate drone so that the individuality of the raga may be felt and impressed on the listeners with the back-ground of the drone. The concept of raga itself crystallised only during the time of Matanga. It logically follows that raga alapana in all its details could have emerged only after the time of Matanga. It was about the same period that the concept of *sa* and *pa* as avikrita svaras or changeless notes emerged.

In many of the temple sculptures in South India we find a four-stringed instrument with a plain finger-board. The resonator of this instrument is mostly trapezoid in shape. This is the Tambura. It is possible that occasionally some music was also played by placing the fingers over the strings on the plain finger-board. Some sculptures support this hypothesis. The strings were close to the dandi and not at a height as in the modern Tambura.

Narada and Tumburu are two of the celestial musicians mentioned together in ancient literature. Since Narada played the Vina, *Mahati*, Tumburu's instrument must have been just a drone. The Mahati did not have the drone coupling. The sculpture at Tirumayam temple in Pudukkottai supports the theory that Tumburu's instrument was only a drone.

It may be pointed out that Tumburu was a Gandharva. Tumburu's Kalāvati, as the name itself suggests (*i. e.*, equipped or designed to give kala or sruti) was only a drone. Kalavati is just a derivative name like Gunavati. Tambura is just a popular name and the classical name of this instrument was Kalavati.

The four-stringed tambura came to be used as an accompaniment to classical music only during the early medieval period. But there were single-stringed drones even from early times, in use in all parts of India by the folk for their simple music. Ektar and Tuntina are examples of these instruments. The bag-pipe drone has also been in existence from early times.

There is the legend about the ten-headed Ravana, that when he was pressed under Mount Kailas, he chopped off one of his heads, cut a nerve from his body and tuned it to the pitch of his voice by tying one of its ends to the chopped off head and held the other end by means of his hands. He then sang Sama gana and pleased Lord Siva. This legend proves that the single-stringed drone is the earliest to appear in Indian Music and that for Sama gana, such a drone was used.

The earlier drones had gourd resonators. Ektar is a good example. Gourd, it may be pointed out is the earliest nature-made resonator to come to the notice of man. Gourd is tumba and the word tambura, as already mentioned had its origin in this word. Tamburas with wooden resonators came at a much later period.

The instrument Tambura is variously referred to as Tambūrā Tambūra, Tamburu, Tambūri and Tambūr. The correct form of this word is Tambūra or Tambūru. The former word is met with in Tyagaraja's two classical kritis in Todi raga " *Koluvamaregada* " and " *Kaddanuvariki* ". The latter form Tambūru is found in Chinni Krishna Dasa's Kriti " *Ento brahmanandamu* " in Bilahari raga. In Purandara Dasa's song, *Kelano Hari tālano* in Kalyani raga, Ata tala the name of the instrument occurs as Tambūri.

The seven-stringed Tambura was popularised by Shatkala Govinda Marar (19th Century).

The sruti box was first devised in Kumbakonam about fifty years ago. Since that time many interesting patterns of sruti boxes have come into existence.

The latest development in the sphere of Drones is the automatically worked Electric Tambura designed and perfected in the Sangita Vadyalaya, Madras.

CHAPTER III

TUNING

In addition to providing the sruti background to performers in concerts, the drone plays an important part in creating the *Mela prāpti i. e.,* the musical atmosphere. It is only after the setting of the mela prapti, that the music in a concert becomes effective and delightful. (The Choice and sequence of items in the early part of a concert has also much to do with the creation of the musical atmosphere. Pieces in ragas like Nata, Kalyani, Kambhoji, Sankarabharana, Kedaram and Pantuvarali are usually preferred for the earlier part. These ragas contain tivra svaras). When the sruti gets established, the accompanists in their turn are able to further contribute to the stability of the sruti by their own music, even as the aerial roots of the Banyan tree which are later growths, contribute to the stability of the tree. Fortified by the sruti from the Tambura and the accompanists, the Principal is able to perform with confidence. It becomes impossible for him to stray away from the sruti.

It has been the practice of senior musicians in the past to come to the concert hall some 15 minutes ahead of the time scheduled for the commencement of the performance, tune the tambura or two tamburas as the case may be and begin playing them even before the time announced for the concert. The great advantage of this practice was that the members of the audience even while entering the concert hall got involuntarily attuned to the sruti and became receptive to the subsequent music. The entire atmosphere of the hall became permeated with the nada from the Tambura. The stage was thus set for the concert. The music from the Principal and his accompanists produced a delightful impression on the audience.

In between items in a concert, when the Principal and the accompanists are taking rest, the music from the Tambura is pleasingly heard. The vacuum which otherwise would have resulted is nicely filled up.

In the manufacture of drones as in the case of other musical instruments, there are the four stages:—

(*a*) The selection of proper materials inclusive of resonant wood, by an expert.

(*b*) The carpenter's work in cutting, sawing, chiselling, carving, shaping and polishing the component parts.

(*c*) The assembling of the parts by a technician and making them into whole instruments.

(*d*) Trials to ensure their concert-worthiness by a musician. The instrument has to be tuned to a high pitch and tested whether the parts are properly glued and fixed to withstand the tension of the strings. The instrument has to be actually played for some hours. When the performance is satisfactory, the instrument may be placed on the market.

In the case of single-stringed drones, the tonic note given may be the middle octave shadja or the higher octave shadja. Where the strings are long as in the Ektar (Ekanadam or Ekatantri) the tonic note given is the middle octave shadja. Where the strings are short as in the Tuntina, (also called Tuntinama) the tonic note given is the higher octave shadja. The bag-pipe belongs to the class of single-note drones and is used in open air performances. It gives the shadja of the higher octave. Till the beginning of this century, the bag-pipe drone was used in the performances of dances, dance dramas and Bommalattam (Puppets).

In two-stringed drones as in the Dotar, both the strings are of the same length and are tuned to the middle octave shadja.

In the sruti box, the shadja and panchama of the middle octave and the shadja of the higher octave are sounded together. Sometimes the mandra sthayi shadja is also sounded. In all sruti boxes, there is the provision for the madhyama sruti (*i. e.*, the tonic of the Fourth). When needed, the panchama is closed and the aperture of the madhyama opened and thus the switching over to the Fourth higher is effected.

In the seven-stringed tambura used by Shatkala Govinda Marar, there were 2 panchamas, 2 saranis, 2 anusaranis and 1 mandaram.

JODI TAMBURA

The tambura is the best of the drones. In addition to giving the sruti svaras, it gives rich harmonics, *i. e.*, overtones.

Some musicians use both a sruti box and a tambura in concerts. The former, giving a fixed pitch, serves as an aid to tune the tambura. The combination will be good, provided both are in accurate tune.

The use of two tamburas is more common. When two tamburas are used, four systems of tuning are adopted.

(1) *Sama sruti:* Herein both the tamburas are of equal dimensions. The corresponding strings used in both are of identical gauge and they are tuned to the corresponding notes.

(2) *Sthayi sruti:* Herein one tambura is tuned in the normal manner and the other tambura is tuned an octave higher. This latter tambura is of a shorter length and the strings relatively thinner than those of the other tambura.

(3) *Samvada sruti*: This was popularised by Mridangam Narayanaswami Appa. Herein one tambura, called the shadja sruti tambura is of the usual size and its strings are tuned to the usual swaras: p s s s The other tambura called the panchama

sruti tambura, is relatively shorter in length and its four strings are tuned to the notes s p p p. In this arrangement, the three shadjas and one panchama of the longer tambura and the three panchamas and one shadja of the shorter tambura balance each other and blend finely. They together give a rich sruti background.

(4) *Kakali sruti*: This system is in vogue in North India. Both the tamburas are of the same size. One is tuned in the usual manner. In the other, the mandra panchama string is tuned to the kakali nishada of the same sthayi, the other three strings being tuned as in the normal tambura. Since the Kakali nishada is the fifth harmonic from the panchama string, it goes pleasingly with the other notes of the tambura.

MADHYAMA SRUTI

When a change to the madhyama sruti *i. e.*, a fourth higher is desired, the Panchama string of the Tambura is reduced to the pitch of Suddha Madhyama. This madhyama virtually becomes the tonic note and music is performed. When a change to a Madhyama sruti is resorted to, the mridangam player however continues to perform in the original shadja sruti.

CHAPTER IV

STRINGED DRONES

1. TAMBURA

(Plates 1 – 9)

Tambura (Plate 1) is the classical drone accompaniment of the stringed group. In outer form, it resembles the vina minus the frets, gourd resonator and the headpiece (Yali). South Indian Tamburas are made of jack wood. In Miraj tamburas, the shell is of gourd. The body of the tambura is semi-globular in shape. The belly on the top is slightly convex. The body is connected to the stem by means of a ledge. The stem leads on to the neck, into which are fixed four tuning pegs - two at right angles to the head and two on the sides. All the four strings are secured directly to the ledge fixed on to the bowl. In the place of the langar of the vina, there are beads threaded upon the strings between the bridge and the attachment. These aid in accurate tuning. The bridge on the belly is of wood. In some tamburas (Plate 2), besides this bridge, there is a small ivory bridge sliding over a portion of the stem from the neck. Over this bridge, the three strings with the exception of the mandaram pass. Once the instrument is set in tune, it is possible to easily alter the pitch of these three strings by merely sliding the bridge up or down, in which case the mandaram string is tuned separately. This is a great advantage from the musical standpoint. It also saves time. The four strings pass over the main bridge and then over the sliding bridge and then through holes in a ledge at the junction of the stem and the neck and then enter the pegs. The mandaram string however, as already mentioned does not pass over the sliding bridge. The length of the sliding bridge is less than three-fourths of the width of the fingerboard so that there is ample space left free for the mandaram string to pass. Tamburas of Tanjore make are

invariably provided with the sliding bridge in addition to the main bridge.

The names of the four strings, their gauge numbers and the notes to which they are tuned are given below :—

No.	Name of the string	The note to which it is tuned.	Gauge No.
1.	Panchamam	Mandra sthayi panchama or p̣	29 steel
2.	Sarani	Madhya sthayi shadja or s	31 ,,
3.	Anusarani	-do-	31 ,,
4.	Mandaram	Mandra sthayi shadja or ṣ	26 Brass

It should be noted that when the instrument is held in a horizontal position with its bowl to the right, the Panchamam string No. 1 is the string farthest away from the performer. The gauge numbers given for the strings here are those commonly met with. There may be slight differences here and there in the thickness of the strings used. The gauge numbers will vary according to the pitch desired by the performer and also according to the length of the dandi.

The tambura is usually held upright and played (See plate 3.). The bowl is made to rest on the right thigh. The four strings which are never stopped are gently pulled one after another, starting from the Panchama and ending with the Mandaram. This process is continually repeated. The fore-finger of the right hand is used for this purpose. Plectra are never used. The maximum effect is produced when the strings are plucked either at the centre or at $\frac{2}{3}$ length from the bridge.

JIVĀLI

Little pieces of silk or wool placed between the strings and the main bridge in a particular position serve to enrich the tonal effect. These threads are called *Jivā* or *Jivāli* (life-givers) and when placed in the correct position, enable one to hear the overtones of each string clearly. (Plates 1 – 3)

The tambura provides an excellent drone accompaniment to any music, vocal or instrumental. It is used in concerts of art music, sacred music, dance music and in operas. The fifth harmonic note, Antara gandhara or E Natural is clearly heard from the Mandaram string. The Chatussruti rishabha of the tara sthayi can be heard from the Panchama string. There are sound holes on the belly of this instrument. The tambura is made both for the rich and the poor. It can be seen in the hands of the ordinary folk as well as in the hands of the aristocracy. Tanjore tamburas are beautifully carved and ornamented with ivory. Trivandrum, Mysore, Vizianagaram, Miraj, Rampur and Lucknow are some of the other leading centres for the manufacture of Tamburas in India.

VARIETIES OF TAMBURA

(1) *Tanjore Tambura* (Plate 2) :—Herein jackwood is used for the bowl, top-plank, the dandi or stem, and the neck. The top-parts of the pegs are flat. The instrument is decorated with ivory work.

(2) *Miraj Tambura* (Plates 4 and 5) :—Herein the bowl is of gourd. The stem and the neck are however made of teak wood. The pegs have round knobs at the top. The dandi is broader than that of the Tanjore Tambura.

(3) *Seven-stringed Tambura* (Plate 6) :—In this instrument, the Panchama, Sarani and Anusarani strings are doubled. The Mandaram string remains single. The seven strings may be plucked successively or the strings of each pair may be twanged simultaneously; that is the Panchama pair may be plucked simultaneously, followed by the Sarani and Anusarani pairs and lastly the mandaram. The successive plucking and the pair plucking may follow one another alternately. The Seven-stringed tambura was first popularised by Shatkala Govinda Marar (1798–1843).

(4) *Eight-stringed Tambura* (Plate 7):—Herein there are the four strings on the top, tuned to the usual notes and four other strings underneath and running parallel to the top strings. The speaking length of the corresponding strings below is about half of the strings on the top, and every lower string is tuned to give the exact upper octave note of the string above. When the above four strings are plucked, the four lower strings vibrate in sympathy and the drone notes, strengthened by the octave notes below are heard in an enriched manner.

In the other variety of Eight-stringed Tambura, the four strings below are of the same length as the top strings but are of a thicker gauge. Some are coiled strings. They are tuned an octave lower down. When the top strings are twanged, the four lower strings vibrate in sympathy and the drone notes strengthened by the resounding lower octave notes are heard pleasingly.

(5) The *Svavādita tambura* (*Automatic tambura*) (Plates 8 and 9) is like the ordinary tambura. In the centre of the dandi, an electric motor is fixed. There are three prongs which successively pluck the strings. Mechanical plucking takes the place of manual plucking in this instrument.

PROCESS OF MAKING

The Jack wood chosen for making a Tambura inclusive of the shell, dandi and neck should all belong to the same parent tree. This will ensure a good tone, since the age of the wood chosen for the different parts will be the same. When the different parts are made of jack wood from different trees, the response will not be even, on account of the disparity in the age of the wood used for the several parts. The wood chosen for making the tambura should be properly seasoned.

The bowl is the first part to be made in a Tambura. A square block of wood of the requisite dimensions is cut. Parts of the outer surface are chiselled off until the block attains the shape of a hemi-spherical bowl. The scooping inside is then begun. The part near the attachment is left a bit thicker in order to sustain the tension of the strings. The top plank, the dandi and the neck are next made and glued on. The bridge and the pegs are then made and inserted at the proper places. The instrument is then stringed. After trials, it becomes fit for use in concerts.

In the *gourd tambura*, the gourd chosen for the resonator is first cut on the top at $\frac{1}{4}$ of its height. Then it is cut at $\frac{1}{4}$ length at its side. This cut gourd is kept immersed in water for some hours. The unrequired tissue-matter on the interior surface of the gourd is removed. The thin sheets of skin on the outer side of the gourd are also removed with a pen-knife. The dandi of the needed dimension is made of Burma teak. A neck of the same wood is made and joined to the gourd. The dandi is joined to the neck of the gourd with sealing wax. Planks from the same wood to cover the top of the gourd and the top of the long dandi and neck are made and joined. The top plank is fixed on to the gourd with glue and bamboo nails. Four pegs of rose-wood with knobs on the top are made. The bridge is made of ivory. The instrument is then stringed. The strings are tied to the ivory end-pin at the top side of the gourd and after passing over the bridge they pass through holes in a ledge. They are then tied to the pegs. After trials, the instrument becomes fit for use in concerts.

2. SUR SOTA

(Plates 10 and 11)

Sur Sota is a cheap tambura made of bamboo. Over the top of a long bamboo stem, four strings pass as in the ordinary tambura. In the interior of the bamboo, provision is made for four

sympathetic strings. These are tuned to the same notes as the four main strings. A part of the bamboo is cut in the centre and through that aperture one can see the four sympathetic strings vibrating inside. When the four playing strings are plucked, the strings inside also vibrate and give an enriched effect.

3. EKTAR

(Plates 12 and 13)

Ektar is the mendicants' drone. A round stick, usually of bamboo of about 4 ft. in length and less than 2 inches in diameter forms the finger-board. One end of this stick is provided with a tuning peg and the other end is passed through a hollow gourd resonator. It has an open string, one end of which is fastened to a nail fixed on to the projection of the stick beyond the resonator. From here ,the string passes over a crude wooden bridge placed on the gourd and then fastened to the peg at the top. To increase the richness of tone, a silken or wollen thread is placed between the bridge and the string. The instrument is held either in the right-hand or the left-hand and the fore-finger is used to pluck the string. The instrument is sometimes decorated with peacock feathers and pearls. Bright copper coins are also fixed on to the gourd by wax.

4. DOTAR

(Plates 14 and 15)

This is the same as Ektar in shape, but two strings tuned to the same pitch are used.

5. TUNTINA

(Plate 16)

This is also a beggar's drone. It consists of a hollow cylinder of wood or metal covered on the lower side with a parchment. A round stick is fixed on the outer wall of this cylinder. This stick is provided with a tuning peg at the top. The small stick and the copper coin below the parchment prevent the string from slipping back. The string is tuned to the key-note of the singer's voice and the tone is sufficiently loud. The top of the stick (stem) is sometimes decorated with peacock feathers. The instrument is held either in the right hand or the left hand and the fore-finger is used to pluck the string.

The string is sometimes tuned to give the higher octave shadja. The string before reaching the peg on the top is made to pass over a part of the back surface of the bamboo stem. The point of contact on the bamboo stem serves the same purpose as the tangential point from which the string emerges from the bridge in a Tambura.

The Tuntina is also used in recitals of ballads and lavanis.

SRUTI COUPLING

The Vina, Gotuvadyam, Pradarsana Vina and Sitar are examples of instruments with the sruti coupling *i. e.* with the sruti strings incorporated in the instrument. The sruti coupling is an integral part of these instruments. These strings are also used to provide a rhythmic accompaniment. Thus they serve two purposes.

CHAPTER V

WIND DRONES

1. OTTU

(Plates 17 and 18)

This is the drone accompaniment used in the nagasvaram band. It resembles the nagasawaram in shape and construction but is slightly longer. It consists of a wooden conical bore of about $2\frac{1}{2}$ ft. in length and enlarges downwards. Into the metal staple at the top, a reed is introduced. A metallic bell adorns the bottom. The bell at the bottom is partially covered to control the volume of sound. In some instruments, there are four or five holes pierced near the bottom. By closing these holes, wholly or partially with wax, the sruti (key-note) of the instrument is brought up to the desired pitch. The drone note is produced continuously without a break by a special device in blowing.

2. TUTTI

(Plate 19)

The Tutti is the common bag-pipe drone used by the rural folk. It was used in dance dramas, dance concerts and puppet shows until recent times. The fascinating timbre of the tara shadja svara emanating from this drone, serves to create a musical atmosphere at the very start. On a still night, this sruti can be heard for a considerable distance.

The bag is made of the skin of a kid. It is inflated from the mouth by blowing into the smaller of the two pipes.

The drone is of cane. There is a reed and its vibrations are controlled by a piece of wire or twine tied round the tongue. The

instrument is made airtight by applying black wax at the joint. In order to tune the instrument to the desired pitch, the holes in the pipe are wholly or partially covered with wax.

Tutti is an abbreviation of Turutti (Tamil) which means bellows. This instrument is called Titti in the Kannada Districts. Sruti Upanga, Bhajana sruti and Moshuq are the other names of this instrument. (Also see Para 2 on P. 6).

3. OTTU SANGU

(Plate 20)

This is a conch drone. It is used in temple ritualistic music. The technique of blowing adopted here is the same as in the Ottu. A continuous stream of air is supplied by the performer. In bigger temples, there are paid musicians on the staff to perform ritualistic music. Some temples have as many as 32 musicians to perform on various stringed, wind and percussion instruments. One can hear the Ottu Sangu performed in the Brihadambal temple in Pudukkottai.

4. NEDUNKUZHAL

(Plate 21)

Nedunkuzhal (literally, long pipe), is an instrument used by the shepherds. It is played to call back the grazing cattle on the hill sides during twilight. The tone, though dull, can be heard for some distance.

Nedunkuzhal is made of bamboo. A mouthpiece is inserted at about the centre of the tube. The part of the pipe below the mouthpiece is the tune pipe. This part has eight finger holes and the performer plays a simple tune on it. The upper part of the pipe has seven holes. This part of the pipe above the mouth-piece is the drone pipe. The air blown inside by

the performer feeds both the tune pipe and the drone pipe. A small hole is pierced at the nodes immediately above and below the region of the mouth-piece and by covering the two holes with a piece of tin, the air passes through the aperture above and below the nodes and then into the two pipes. The two pieces of tin are secured to the pipe with yellow wax and are kept in position by strings tied round the pipe. The instrument is about 3 feet two inches long.

Unlike the Magudi, wherein the drone pipe is coupled with the instrument, in the Nedunkuzhal, the drone is part and parcel of the instrument. The pitch of the instrument can be regulated when necessary by partially closing some of the holes on the top of the instrument.

5. SRUTI BOX

(Plates 22 and 23)

This is a popular and ready-made drone and is widely used in South India. It requires a certain amount of sruti gnana and dexterity to handle a tambura. But to use a sruti box, no such capacity is required. Once the instrument is made and the tuning is perfected, any one can use it. On account of this fact, the sruti box has become very popular. It is used in both urban and rural parts. It is used in concerts of art music, sacred music, dance music, folk music, operas and dance dramas. In recent times, even the nagasvaram performers are showing a preference for the sruti box and are slowly giving up the time-honoured ottu.

The harmonium paved the way for the development of the sruti box. The sruti box was first made in Kumbakonam about the beginning of this century. Many improved patterns have since come into existence.

A good sruti box should conform to the following requirements :—

(1) The tuning of the reeds should be accurate.

(2) The tone emanating from the instrument should be pleasant, sweet, uniform and continuous.

(3) The working of the bellows and valves should be perfect. (This will ensure the supply of a steady and continuous stream of air).

(4) The use of the bellows should involve minimum effort.

(5) The instrument should have provision for the adjustment of tonal volume or intensity of sound.

(6) It should be compact and beautiful to look at.

(7) The finish should be good.

Sruti boxes are usually made with provision for two different sets of pitches. The shadja, panchama and tara shadja svaras are provided for each pitch. The suddha madhyama is invariably added so that one can switch over to the madhyama sruti, when required. Thus there are four reeds for a pitch. If two different srutis are desired, 8 reeds will be required. If the mandra shadja is also desired for the two srutis, space for these two extra reeds should be provided. The reeds are screwed on to a reed board, which is about a third of an inch in thickness. Four or five rotating circular pieces of wood and provided with an aperture are screwed on to the top of the reed board. The position of the aperture is so adjusted that it is just above the reed of the required pitch. The air pumped into the chamber by the bellows is allowed to escape through the aperture and in the process, the reed is set in vibration. The non-exposed reeds do not vibrate.

Deal wood or teak wood is used in making the sruti box. The bellows have two folds on one side and three on the other. This arrangemet ensures an adequate supply of air. The bellows are made of thin pieces of card-board cut to the required dimensions. The borders are joined with leather or calico and the outer surface of the card-boards are pasted with marble paper or calico. There is a valve arrangement which enables the air pumped inside to make its exit only through the reeds in the reed board.

A simple rectangular box of plywood or other wood is made as a case for the sruti box.

6. TAMBURA PETI

The *Tambura peti* type of sruti box has an intelligent device. The reeds for a particular sruti are screwed on the under side of a stick. The stick has an opening immediately above each reed. The stick is screwed or clamped to the top part of the sruti box. When another sruti is desired, this reed stick is removed and is replaced by another reed stick containing the requisite reeds. Thus with the common air chamber, one can use the box for any number of srutis. The tambura peti is small and compact and is just about the size of a big book.

APPENDIX I

Note :—A thorough and comprehensive system of classification of musical instruments from as many points of view as possible is given in this Appendix. The systems of classification under each Table are not however mutually exclusive. An instrument like the Vina will appear under the groups of Plucked instruments, Fretted instruments, Polyphonous instruments, Concert instruments, Primary instruments, Current instruments and so on. The idea in presenting these possible systems of classification is to help the reader to understand analytically the several features of each instrument.

TABLE I.

Different Systems of Classification of Musical Instruments

(Wellknown instruments are given in brackets as examples under each type)

I. (a) Stringed (Vina)
(b) Wind (Nagasvaram)
(c) Percussion (Mridangam)

II. (a) Tata (Chordophones-Violin)
(b) Sushira (Aerophones-Flute)
(c) Avanaddha (Membranophones-Tabla)
(d) Ghana (Autophones-Cymbals)

III. (a) Sangita vadya *i. e.*, Useful for playing music (Nagasvaram)
or (b) Pradarsana vadya *i. e.*, Useful for demonstrating the various Musical laws, facts and phenomena (Graha bheda pradarsini)

IV. Utility in Concerts :—
Used as :
(a) Sruti Vadya (Drone-Tambura)
(b) Tala Vadya (Mridangam)
(c) Sangita Vadya (Vina)

V. (a) Primary *i. e.* a Principal Instrument (Ayan vadya —Vina)
or (b) Accompaniment (Pakka vadya —Mridangam)

VI. Sphere of use :—
(a) Used in Concert music (Vina)
(b) Used in Temple music (Ekkalam)
(c) Used in Martial music (Dundubhi)
(c) Used in Folk music (Silambu)

VII. (a) Single purpose Instrument (Tambura—useful only as Drone)

or (b) Multi-purpose Instrument (Pradarsana vina. This can be used as a Tambura and Gotuvadyam and also used for visually and aurally explaining the various laws, facts and phenomena relating to music).

VIII. (a) Whether used to play music alone (ex. Vina)

or (b) Used for purposes other than music :—

(i) Used for publicity :— (Tamukku).

(ii) Used in sacrifices :— (Tyaga Murasu)

(iii) Used in courts of justice Judgement Drum :— (Nyaya Murasu)

(iv) Used in war :— (Vira Murasu)

IX. (a) Monophonous *i. e.* On which only one note cane be played at a time—(Flute)

or (b) Polyphonous *i. e.* On which more than one note can be played at a time—(Piano)

X. (a) Suddha Vadya *i. e.* Single instrument (Tambura) *or*

(b) Misra Vadya *i. e.* Combinational Instrument (Jalectromonium, is a combination of Jalatarangam & Harmonium)

XI. (a) Whether provided with a drone coupling (Magudi & Vina)

or (b) not provided with a drone coupling (Violin)

XII. (a) Stationary (Organ & Musical Stone pillars)

or (b) Portable (Violin)

XIII. (a) Whether the name has an onamatopoetic origin (Budubuduke and Urumi are so named because of the particular sounds given by them.)

or (b) Otherwise. (Vina)

XIV. Name:-(a) Whether the name is derivative

or (b) Whether the name is arbitrary. Venu (Flute) is a derivative name since it is made of Bamboo or Venu. Likewise Sarangi and Mridangam are named after the materials used in their manufacture. Nāgapani and Pirai kombu are so named because the former is serpent-shaped and the latter is crescent-shaped);

Idai surungu parai is so named. because of the narrows tructure of the central part).

XV. (a) Manually played (Sanai)

or (b) Automatically played (Svavadita Tambura or the Automatic Electric Tambura)

XVI. (a) Tunable (All stringed instruments and Mridangam can be tuned to a desired pitch)

or (b) Non-tunable (Flute, Ghatam and Cymbals. Herein the pitch of the insrument is determined at the make itself)

XVII. Compass

(a) Ekasthayi Vadya.

(b) Dvisthayi Vadya.

(c) Tristhayi Vadya.

(d) Chatussthayi Vadya etc.

XVIII. (a) Ubiquitous (Occurring in all countries—Ex. Flute and Harp)

or (b) Local (Used in a particular country—Balalaica (Russia) and Vina (India)

XIX. (a) Whether revealed to man by Nature (Flute)

or (b) Developed by his own inven-ventive genius (Mridangam)

XX. (a) Current
Vina is a current instrument and is a Jiva vadya.

or (b) Obsolete
Yazh is an obsolete instrument and is not now in use. Mattakokila of Bharata, Chitra of Matanga and Vipanchi of Svāti have become obsolete.

TABLE II.

Different Systems of Classification of Tata vadyas (Stringed Instruments or Chordophones)

I. (a) Plucked (Vina) (b) Bowed (Violin) (c) Hammered (Piano)	II. (a) Monophonous (Tambura) (b) Polyphonous (Gotuvadyam)
III. (a) Used as a solo instrument (Vina) *or* (b) Used as an Accompaniment (Violin & Sarangi) (Rarely, Violin is also used as a solo instrument by top-ranking performers)	IV. Used as :— (a) Sruti vadya (Tambura) *or* (b) Tala vadya (Gettuvadyam) *or* (c) Sangita vadya (Gotuvadyam)
V. (a) Used for playing Classical Music (Vina) *or* (b) Used in Folk Music (Tuntina)	VI. (a) Sangita Vadya *i.e.* Concert Instrument (Vina) *or* (b) Pradarsana Vadya *i.e.* Demonstration instrument (Graha bheda Pradarsani) *or* (c) Both (Pradarsana Vina)
VII. (a) Whether provided with a fretted finger-board as in Vina and Sitar (Movable frets in Sitar and fixed frets in Vina) *or* (b) has a non-fretted finger-board (*i. e.*, a plain finger-board) as in Sarode and Violin.	VIII. (a) Whether provided with a key-board as in Piano and Bulbul-tara *or* (b) not provided with a key-board (Violin)

IX. (a) Whether provided with a drone coupling (Vina)

or (b) not provided with a drone coupling (Violin)

X. (a) Whether the strings used are of metal, as in Sitar;

or (b) of guts, as in Yazh ;

or (c) both metallic strings and guts, as in Violin ;

or (d) Silken strings, as in Svarabat.

The metallic strings used may be plain or twisted. In twisted strings, a metallic coil is wound round a string of silk, gut or metal. These coiled strings are designed to give notes of low pitch.

XI. Materials used in the make :—

Made of :—

(a) Wood alone (Violin)

(b) Wood and Gourd (Sitar)

(c) Gourd and Bamboo (Ektar)

(d) Wood and Bamboo (Tuntina)

(e) Bamboo alone (Bamboolin)

XII. (a) Whether provided with sympathetic strings, as in Sarangi ;

or (b) Not provided with such strings, as in Violin.

XIII. (a) Whether played on open strings (Tambura)

or (b) Played on stopped strings (Violin)

or (c) Played on both open strings and stopped strings (Vina)

XIV. Whether the strings are kept in

(a) Medium tension, as in Vina;

or (b) In full tension, as in Gotuvadyam

XV. (a) Whether during play, the fingers are in direct contact with the strings. (Finger-tips are in contact with the strings in the violin and vina and finger nails are in contact with the strings in Sarangi.)

XVI. Whether the plectrum used to pluck the strings is of :—

(a) Metal as in Vina ;

or (b) of horn or celluloid as in Swarabat.

or (b) Whether the strings are stopped through an intervening mechanism like the key as in Bulbultara and stick as in the Gotuvadyam.

XVII. Compass :—

(a) Ekasthayi Vadya (1 octave)

(b) Dvisthayi ,, (2 octaves)

(c) Tristhayi ,, (3 octaves)

(d) Chatusthayi ,, (4 octaves) etc.

XVIII. Whether,

(a) Suddha *i. e.* a unitary instrument (Violin).

(b) Misra *i. e.* a combined instrument (Pradarsana Vina). In the Pradarsana vina, the Tambura and Gotuvadyam are blended together.

XIX. Number of strings used :—

(a) One-stringed (Ektar)

(b) Two-stringed (Dotar)

(c) Three-stringed (Kinnari)

(d) Four-stringed (Tambura)

(e) Five-stringed (the special violin with the extra bass string and tuned to Anumandra Panchama)

(f) Seven-stringed (Vina and Sitar)

(g) Eight-stringed (Sthayi Tambura)

(h) Fourteen-stringed (Yazh)

(i) Twenty-one stringed (Mattakokila)

(j) Forty-stringed (Pradarsana Vina)

(k) Hundred-stringed (Satatantri-Vina)

XX. (a) Whether the strings are struck directly with a stick as in Gottuvadyam.

or (b) Whether they are struck indirectly through hammers as by pressing a key in the Piano.

XXI. Whether

(a) Stationary (Aeolian Harp and Sthira Vina)

or (b) Portable (Violin)

XXII. Whether

(a) Played manually (Vina)

or (b) Played automatically (Svavadita Tambura)

XXIII. Whether

(a) Ubiquitous (Harp)

or (b) National (Vina)

XXIV. (a) Whether the instrument bears a derivative name as Gotuvadyam

or (b) an arbitrary name as Tuntina.

XXV. Shape of the resonator :—

(a) Hemi-spherical (Vina)

(b) Boat-shaped (Yazh)

(e) Bucket-shaped (Svarabat)

(d) Cylindrical (Tuntina)

(e) Trapezoid (Swaramandali)

(f) Rectangular (Piano)

(g) Triangular (Balalaica)

(h) Oblong (Balakokil)

(i) Wedge-shaped (Rebab)

(j) Pear-shaped (Mondoline)

(k) Club shaped (Rebec)

(l) Tube-like (Sursota)

XXVI. (a) Current instrument (Vina)

or (b) Obsolete instrument (Yazh)

XXVII. Posture in play.

(a) Gotuvadyam and Gettuvadyam are kept on the floor in front of the performer and played.

(b) Vina and Tambura are kept in the vertical or horizontal posture and played.

(c) Sitar is kept in an oblique posture and played.

(d) The Unchavritti Bhagavatar has the tambura suspended from his right shoulder through a thick cotton tape and plays on it.

TABLE III.

Different Systems of Classification of Sushira Vadyas

(Wind Instruments or Aerophones)

I. (a) Whether manually blown as flute and sanai;

There are the mouth-blown flutes (Murali) and nose-blown flutes (Nasajantra)

or (b) Wind is supplied through a mechanical contrivance (bellows) as in the Harmonium & Organ.

II. (a) Whether wind is blown across an orifice in the wall of the instrument as in flute ;

or (b) Wind is blown through a vibrating reed or tongue or mouthpiece as in Nagasvaram, Clarinet and Mukhavina

III. (a) Whether the instrument has finger-holes (flute)

or (b) Has no finger-holes (Tiruchinnam)

IV. Whether

(a) Wood-wind (Nagasvaram)

or (b) Brass-wind (Gaurikalam)

or (c) Stone-wind (Stone nagasvaram)

There is also a Musical pipe scooped out of a stone pillar in the temple at Shanbagaramanallur.

V. Whether

(a) Monophonous (Flute)

or (b) Polyphonous (Organ)

VI. Whether

(a) Solo (Nagasvaram)

or (b) or playd as an accompaniment (Clarinet)

VII. Whether used as :—

(a) Sruti Vadya (Ottu)

or (b) Tala Vadya (Conch)

or (c) Sangita Vadya (Flute)

VIII. (a) Whether used to play classical music (Nagasvaram)

or (b) Used to play folk tunes as Nedunkuzhal

IX. (a) Whether provided with a key-board (Organ & Harmonium)

or (b) not provided with key-board (Flute)

X. (a) Whether provided with a drone-coupling as Magudi

or (b) not provided with such a coupling (Nagasvaram)

XI. (a) Whether Suddha (Flute)

or (b) Misra (Jalectromonium)
In this instrument, Harmonium and Jalatarangam are combined.

XII. (a) Whether Stationary (Organ)

or (b) Portable (Trumpet)

XIII. Compass:–Ekasthayi (1 octave)
Dvisthayi (2 octaves)
Tristhayi (3 octaves)
Saptasthayi(7 octaves)
etc.

XIV. Whether the finger-holes are closed through fingers (Flute) or through keys operated by fingers (Clarinet and Boehm flute).

XV. Whether

(a) Ubiquitous (Flute)

or (b) National (Nagasvaram)

XVI. Whether the instrument bears:–

(a) a derivative name(Venu). Flute is called Venu because it is made of Venu, *i. e.* bamboo)

or (b) an arbitrary name (Tarai)

XVII Shape of the Resonator :—

(a) Cylindrical (Flute)

(b) Conical (Nagasvaram)

(c) Crescent-shaped (Kombu)

(d) S-shaped (Kora Kombu)

(e) Spiral-shaped (conch)

(f) Snake-shaped (Nagapani)

(g) Bottle-shaped resonator (Magudi)

(h) Rectangular (Harmonium)

XVIII. Whether

(a) Current (Flute)

or (b) Obsolete.

XIX. Utility :—

(a) Used in concerts—Flute.

(b) Used in Temple rituals (Bhuri)

(c) Used in Martial music (Conch)

(d) Used in Dance Music (Clarinet)

(e) Used in folk music (Ayarkuzhal)

XX. Whether :—

(*a*) Keyed — Boehm Flute

or (*b*) Key-less—Indian Flute

XXI. Technique of blowing :—

(a) Continuous blowing (Flute)

or (b) Alternately blowing and drawing in of the air (Mouth-organ)

XXII. Posture in play :—

(a) Side-blown flutes

(b) Direct flutes

(c) Vertical flutes
Nagasvaram and clarinet are held in the same posture as the direct flutes and played.

TABLE IV.

Different Systems of Classification of Avanaddha Vadyas

(Drums or Membranophones)

I. Whether

(a) Drum with skin strained over one side of an open circular frame (Kanjira) ;

or Over a metallic ring as in Suryapirai ;

or Over a ring of bamboo as in Kanaka tappattai.

or (b) Drum with skin stretched over a hollow shell (Damāram)

II. Number of drum faces: –

(a) Eka-mukha vadya (single-faced drum—Tamukku)

(b) Dvi-mukha vadya (Two-faced drum—Mridangam)

(c) Panchamukha vadya (Five faced drum)

III. Whether

(a) Drum with plain faces (Udukkai)

or (b) Drum with complex faces *i. e.*, made up of 2 or 3 concentric rings of skin (Mridangam)

IV. Manner of play: –

(a) Played by hand—Mridangam.

(b) Played with one stick or two sticks (Tavil and Damaram respectively)

(c) Played with a straight stick (Tambattam) or with a strap of hard rubber (Tamukku)

(d) Played by hand on one side and by a stick on the other side (Tavil)

(e) One side struck and the other side stroked—Urumi.

(f) Self-struck — Damaru and Budubuduke

Herein the instrument is rattled and the knotted end of the string strikes the two faces alternately.

V. (a) Used singly—Mridangam.

(b) Used in pairs : Pambai and Damaram.

VI. (a) Whether capable of providing a cross-rhythmical accompaniment like the Mridangam, Tabla, Kidikittu.

or (b) Useful for only simple strokes : Nagara.

VII. Utility:—

(a) Used in concerts (Mridangam)

(b) Used in Temple music (Sanna Dhol)

(c) Used in Martial Music (Rana Dundubhi)

(d) Used in Folk Music (Tappattai)

(e) Used for publicity.
Drums like Parai and Tamukku are used for publicity purposes.

(f) Used for communication. Africans use a drum language.

Nagara was used for communicating information. (Tiru mal Naik of Madurai used to take his meals only after the conclusion of the midday Puja to the Deity Andal of Srivilliputtur. In order to know this, he built a series of Nagara Mantapas. The drum stations relayed in succession the news of the conclusion of the Puja through appropriate strokes.

(g) Used in Village look-outs to warn the villagers of approaching robbers.

(h) There are also the funeral drums.

VIII. Status in concerts :—

(a) Pradhana Tala-vadya (Mridangam)

(b) Upa-tala vadya (Kanjira)

IX. (a) Whether capable of being tuned to a desired pitch (Mridangam)

or (b) Whether the pitch is determined at the make—Bheri.

X. Material of which body is made :-

(a) Wooden drums (Mridangam)

(b) Metallic drums (Udal)

(c) Earthen drums (Khol)

XI. Shape of the shell:—

(a) Cylindrical (Pambai)

(b) Barrel-shaped (Mridangam)

(c) Mortar-shaped (Timila)

(d) Conical (Damarum)

(e) Hour-glass shaped (Udukkai)

(f) Hemispherical (Nagara)

(g) Pot shaped (Kudamuzha)

XII. (a) Monophonous (Kanjira)

(b) Polyphonous—(Tabla Tarang and Panchamukha vadyam.)

XIII. Whether used as :-

(a) Sruti Vadya—Edaka

or (b) Tala Vadya–Mridangam

or (c) Sangita Vadya—Tabla tarang

XIV. Compass:—

Usually drums give a single note. But by damping fractional areas of the drum-head or by subjecting the drum-head to varying degrees of tension as in Idakka, many notes can be played. The compass of Panchamukha vadyam is 5 notes and tabla tarang one octave or more.

XV. (a) Whether the instrument has a derivative name (Idaisurungu parai)

or (b) An arbitrary name (Tavil)

or (c) an onamatopoetic name (Budubuduke and Urumi)

XVI. Whether :—

(a) Ubiquitous (Tambourine)

or (b) National (Mridangam)

XVII. Whether :-

(a) Current (Mridangam)

or (b) Obsolete (Panava)

XVIII. Special drums :-

(a) Nyaya murasu (Judgement drum)

(b) Vira murasu (Martial drum)

(c) Tyaga murasu (Sacrificial drum)

(d) Jaya bheri (Victory drum)

(e) Mangala bheri (Auspicious drum)

XIX. Posture in Play.

In concerts, the Mridangam and Tabla are kept in front of the performer and played. In mobile music parties, as in a street bhajana or in a nagasvaram party preceding the temple procession, the mridangam and the tavil are tied to the waist and played. The Pambai and Kidikittu are likewise tied to the waist and played.

The Suryapirai and Chandrapirai are tied to the forehead over a thick cloth cushion and played with sticks.

XX. Whether :-

(a) Stationary (Panchamukha vadyam).

or (b) Portable (Mridangam)

XXI. Whether :—

(a) The drum forms part of a band.

The Kinlkittu is a component instrument of the band, *Naiyandi melam.*

or (b) is played independently (Nagara)

XXII. Whether :-

(a) The skin is strained over the circular edge of the frame as in Kanjira.

or (b) is just stretched over the circular edge of the shell and kept in tension by the hand (Idakka)

TABLE V.

Different Systems of Classification of Ghana Vadyas or Autophones

I. Whether made of :-

(a) Metal (Cymbals, Triangle)

or (b) Wood (Castanets & Xylophones)

or (c) Stone (Stone gongs and Musical stone pillars)

or (d) Mud or clay (Ghatam and Jalatarangam)

II. Whether :—

(a) Used singly (Semakkalam)

or (b) Used as a pair (Jalra)

III. (a) Whether useful for providing a cross-rhythmical accompaniment in concerts (Jalra)

or (b) Useful for only ordinary rhythmical accompaniment and routine strokes (Brahma tala)

IV. Utility :—

(a) Used in concerts (Jalra)

(b) Used in temple rituals (Brahma talam)

(e) Used in Dance concerts (Nattuva talam)

(d) Used in folk music (Crude cymbals of iron)

V. Shape :—

(a) Circular (Jalra)

(b) Concave disc of metal (Kuzhi talam)

(c) Cylindrical (Tubophone)

(d) Oval (Pujari Kai-silambu)

(e) Bent oval-shaped silambu used by Kandyan dancers.)

VI. Whethcr .—

(a) Monophonous (castanets)

or (b) Polyphonous (Tubophone & Xylophone)

VII. Whether

(a) Suddha (Jalra)

or (b) Misra (Carillon)

VIII. Compass :—

Jalra gives a single note. But the compass of tubophone and xylophone extends over two octaves

IX. Whether used as :—

(a) Sruti vadya (Sruti sthamba)

or (b) Tala Vadya—Jalra.

or (c) Sangita Vadya—Musical stone pillars

X. Manner of play :—

(a) Played by hand—Jalra.

(b) Struck with sticks (Xylophone)

XI. Whether :—

(a) Stationary— (Huge temple bells mounted on stands)

or (b) Portable—Jalra.

XII. Posture in play :—

Ghunguru, and Xylophone are kept in front of the performer and played. The semakkalam is suspended from the left arm and played.

XIII. Whether :—

(*a*) the instrument forms part of a band ;

The Ilattalam is a component instrument of the Kathakali band. It is $\frac{1}{2}$ an inch in thickness and its diameter is 5 inches. It is of bronze.

or (b) is played independently (Xylophone)

XIV. Whether :—

(*a*) the Pitch of the instrument is determined at the make (Jalra)

or (b) can be tuned to a desired pitch (Jalatarangam)

XV. Whether :—

(a) the instrument has a derivative name - (Jalatarangam - udaka vadyam or water instrument)

or (b) an abitrary name-Chipla.

APPENDIX II

Maintenance and Repairs

Musical instruments should be kept in a good condition. It is only then that they will give a good, sustained and faithful performance. Carelessness in handling has resulted in the loss of the tonal quality of many a costly instrument. Musical instruments from their very nature are delicate and sensitive. They are easily affected by exposure and excessive tension of the strings. Relatively speaking, Chordophones and Aerophones require a greater attention than Membranophones and Autophones.

The following precautions may be taken :—

1. Musical Instruments should be kept in cases lined inside with silk, velvet, flannel or other suitable cloth. As an alternative, cloth covers of khaki or other thick cloth with press buttons stitched along the borders may be used. These precautions will ensure immunity from climatic effects.

2. The instruments should neither be kept in moist places nor in places subject to extremes of heat and cold.

3. After use, the instruments should be kept back in cases or in special stands or wrapped in cloth covers and kept in a safe corner.

4. The periodical application (once a week) of a thin coating of cocoanut oil over the steel strings will prevent them from rusting.

5. A periodical check up of the glued parts is essential

6. The soundness of parts like the Attachment, Button, End pin, Langar, Bridge, Finger-board, Pegs, Gut of the Tail piece, Strings etc. may be made and the necessary repairs attended to then and there. A stitch in time saves nine.

7. If a bridge has to be replaced by a new one, care should be taken to see that the feet of the new bridge are in perfect contact with the top plank of the instrument. The arching of the feet of the bridge should accord with the curvature of the top-plank of the instrument. Otherwise a nasal sound or a choked sound will ensue.

8. The pull exercised by the tension of the different strings on the frame of the instrument should be uniform. For this purpose, strings of correct gauge numbers should be selected and used.

9. It through negligence or impact, the wooden shell of Tambura or Vina develops a crack, it may be patched up by a competent repairer and the tonal quality restored.

If the wooden shell breaks up into a number of pieces, even then, the top plank may be removed, the pieces carefully patched and the shell re-formed and used.

10. When the glued parts develop an opening, without any cause, it is an indication, that the life of the glue is spent out. In such cases, the parts should be opened and glued afresh. This will ensure another period of long life to the instrument.

11. If an instrument has to be re-varnished, care should be taken to see that the same kind of varnish is used and to the same extent.

Suggestions to the Professional Repairer

1, When an instrument is brought for repair, carefully examine the entire instrument. Suggest to the customer even the additional repairs which should be carried out in the interest of the good performance and life of the instrument, even though the customer is not aware of the needed additional repairs.

2. Make a list of all the tools and materials required for carrying out the repairs. Even if some tools are not with you, borrow them.

3. Calculate properly the time that will be taken to carry out the repairs. The instrument after repair should be delivered to the customer on the day promised.

4. Do not remove costly parts and strings and replace them by cheap ones. The customer will not be able to detect this replacement immediately. The repairer should acquit himself of the trust reposed in him by the customer.

5. Give a correct and just estimate of the cost of repairs (cost of the required new parts, plus labour). After carrying out the repairs do not ask for extra money. It will be found paying in the long run, to have more customers paying moderate charges than few customers paying extravagant charges. Remember that by getting more work, you acquire valuable experience and this will stand you in good stead

6. Before delivering the repaired instrument to the customer, have its concert-worthiness tested by a musician.

7. Do not undertake to carry out repairs which you cannot do properly Be honest enough to suggest the name of a more competent person for the purpose. Or, after having undertaken to carry out the repair, take it to a competent repairer and get the work done satisfactorily.

APPENDIX III

List of Musical Instruments in the Gallery of the Sangita Vadyalaya

STRINGED INSTRUMENTS

Bambolin (Bamboo violin)
Bhatta bin
Dilruba
Dotar
Ekanda vina
Ektar
Esraj
Gettuvadyam
Gotuvadyam
Guitar
Kachva sitar (with flat gourd)
Kinnari
Koto (Japanese Harp)
Mandoline
Mayura Rudra vina
Mute Violin
Phono Violin
Pradarsana Vina (of Jack wood)
,, (with flat gourd resonator)
Rusbin
Samisen (3 stringed Japanese instrument)
Sarangi
Sarode
Sarode (Tenor)
Shahi Baja
Sitar
Subra vina
Surbahar
Sursota
Surtara
Svarabat
Svaramandali
Svayambhu svara vina
Tambura (Tanjore Model)
,, (Trivandrum Model)
,, (Miraj Model)
,, (Seven-stringed)
,, (Eight-stringed)
,, (Automatic)
Tambura Peti
Tarab sitar
Tar Sarangi
Taus
Tukari
Tuntina
Vina
Vina (with plywood resonator)
Vina-cum-Gotuvadyam
Violin ($\frac{3}{4}$ size)
Violin (Full size)
Violin (Seven-stringed)
Violin (17th Cent.)
Violin (Gourd Resonator)
Violin (made of jack wood)
Yazh

WIND INSTRUMENTS

Bhuri
Davalai Sangu
Ekkalam
Flageolet
Flute (Bamboo)
,, (Chinese)
Gaurikalam
Kal Nagasvaram (*i. e.* made of stone)
Kombu (Pirai kombu)
Kona buri (Valaivu buri)
Kona Kombu (S-Shaped horn)
Magudi (two specimens)
Mukhavina
Nagasvaram (Bari)
Nagasvaram (Timiri)
Nedunkuzhal

Nepalese horn (Pair)
Ottu
Ottu Sangu
Pepa (Assamese flute)
Peyttarai
Reed Dulcimer
Sanai
Shakubachi (Japanese Bamboo Flute)
Sruti Box (ordinary)
,, (Nagapattinam model)
Tiruchinnam
Tutti

PERCUSSION INSTRUMENTS

Drums

Baya
Budubuduke
Chandra Pirai
Chenda
Dakka
Damaram
Damaru
Danka
Dasari tappattai
Davandai
Dep
Dol
Dolki
Idakka
Kanjira
Kanjiri
Kinikittu (Kidikittu)
Kudamuzha
Kundalam
Mridangam
Nagara
Pakhawaj
Pambai
Panchamukha vadyam
Sanna dol
Suddha maddalam
Suryapirai
Tabla
Tabla Tarang
Tambourine (Kandy)
Tamukku
Tantipanai
Tappattai
Tavil
Timila
Uduke (Kandyan)
Udukkai
Urumi

Cymbals

Brahma Talam
Ilattalam
Jalra
,, (Pandharpur type)
Kuzhittalam
Nattuva talam
Semakkalam
Talam

Castanets

Chakkai (Wooden sticks)
Chipla
,, (Pandharpur type)
Tikkiri kattai
Xylophone

Other Instruments

Gejjai
Ghanta (Bell)
Jalatarangam
Jamidika
Moursing
Pantheru (Kandy)
Pujari Kai Silambu
Kal Silambu (oval-shaped silambu and used by Kandean dancers)

Accessories

Violin case (single)
,, (Double)
Varieties of Plectrum, Finger boards, Tail pieces, Tuning pegs, Violin bows.

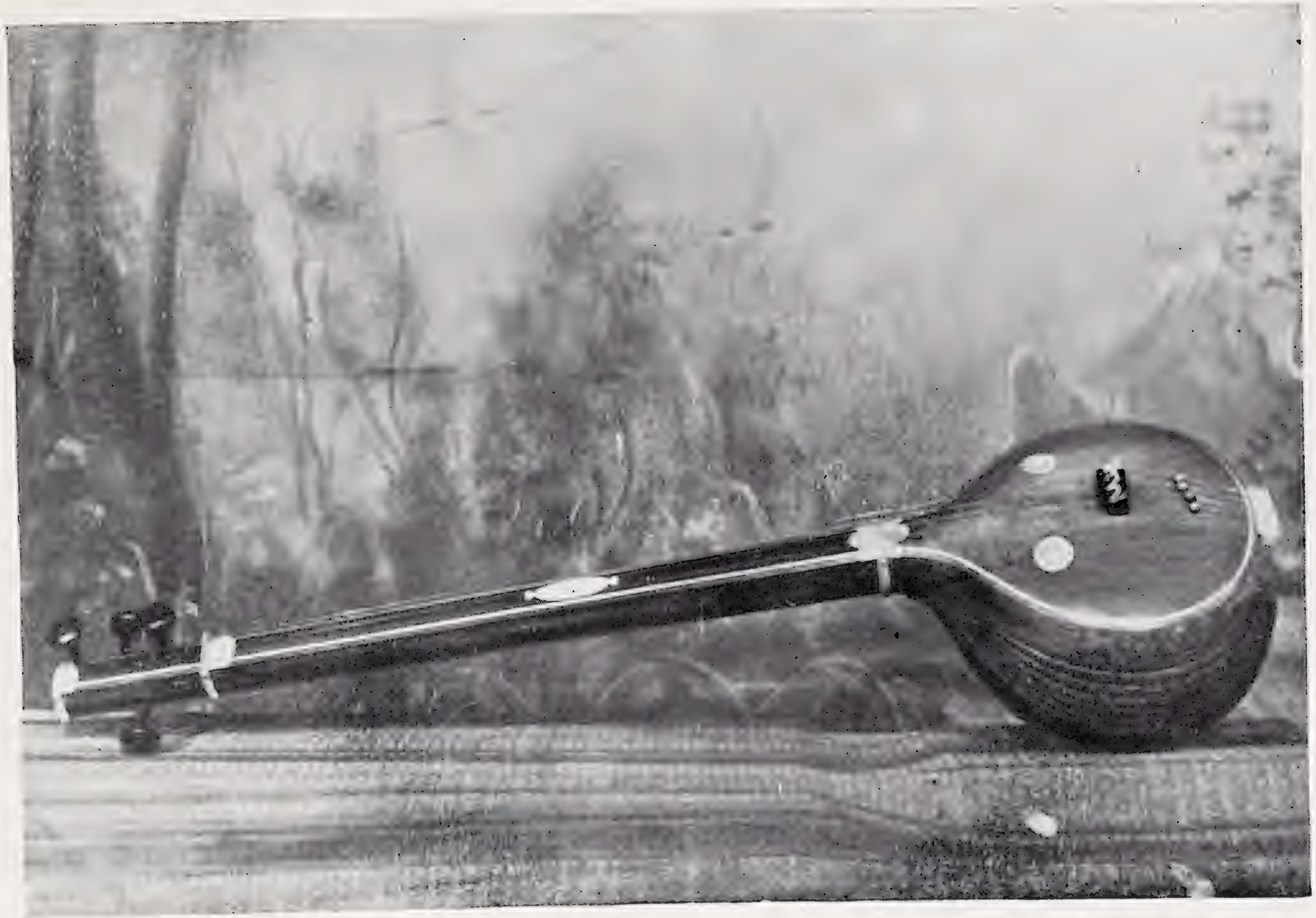

Plate 1. Tambura

Plate 2. Tambura with the sliding bridge (Mēl mettu or edir mettu) on the top

Plate 3. Tambura-Playing Posture.

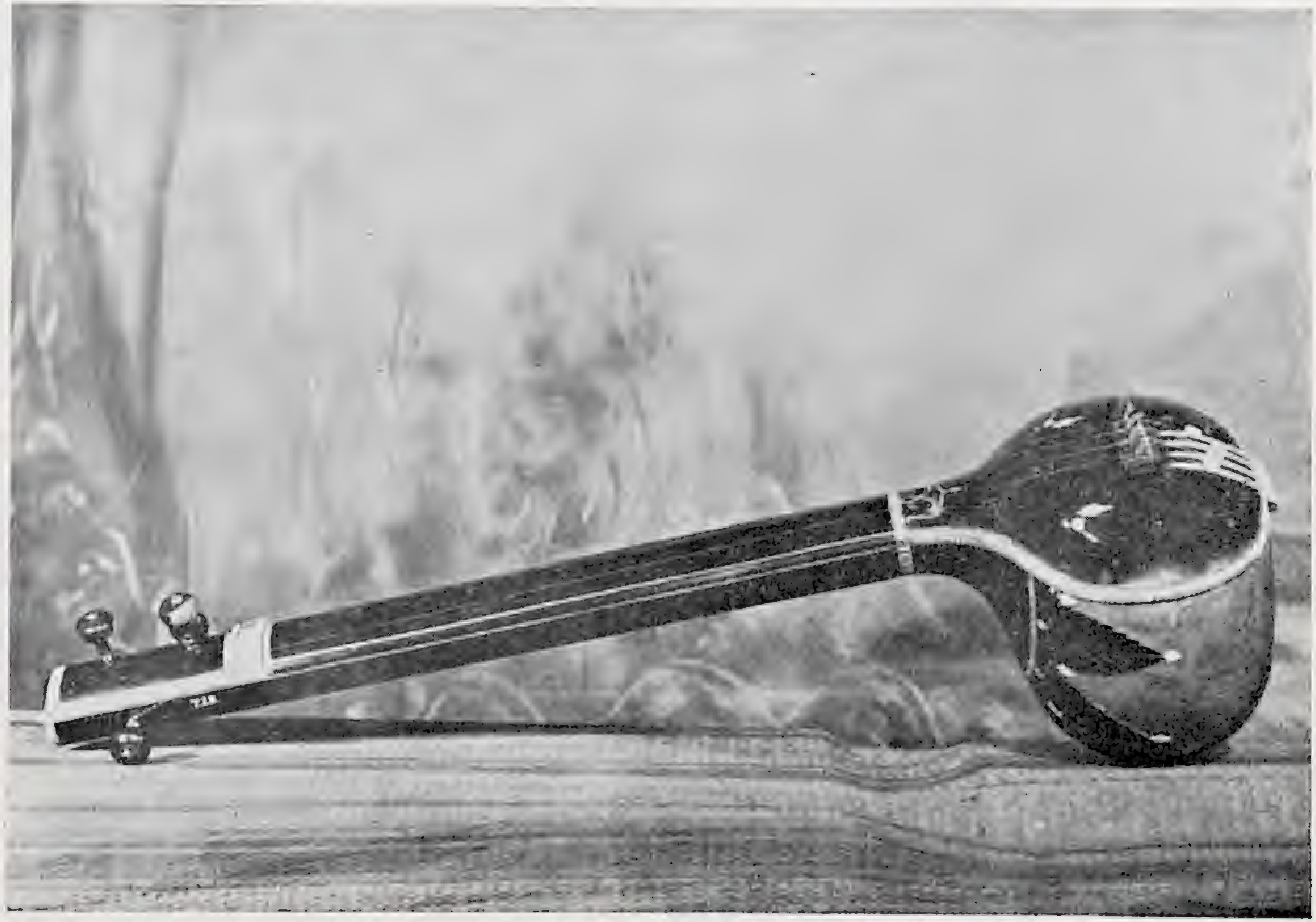

Plate 4. Tambura (Miraj model)

Plate 5. Tambura (Miraj model playing posture)

Plate 6. Seven-stringed Tambura

Plate 7. Eight-stringed Tambura

Plate 8. Automatic Tambura

Plate 9 Svavadita Tambura (Automatic Tambura) in action in a concert.

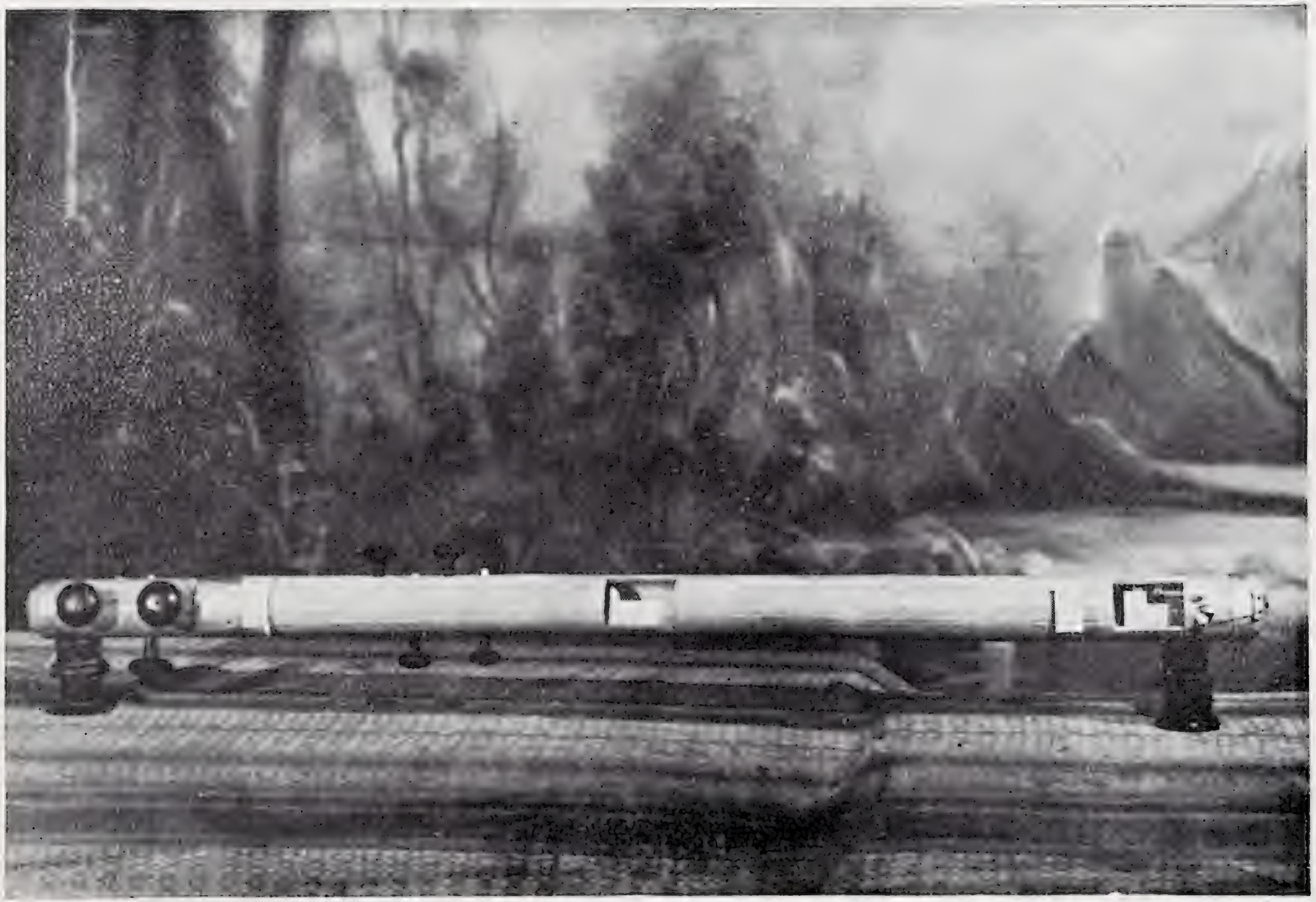

Plate 10. Sur sota

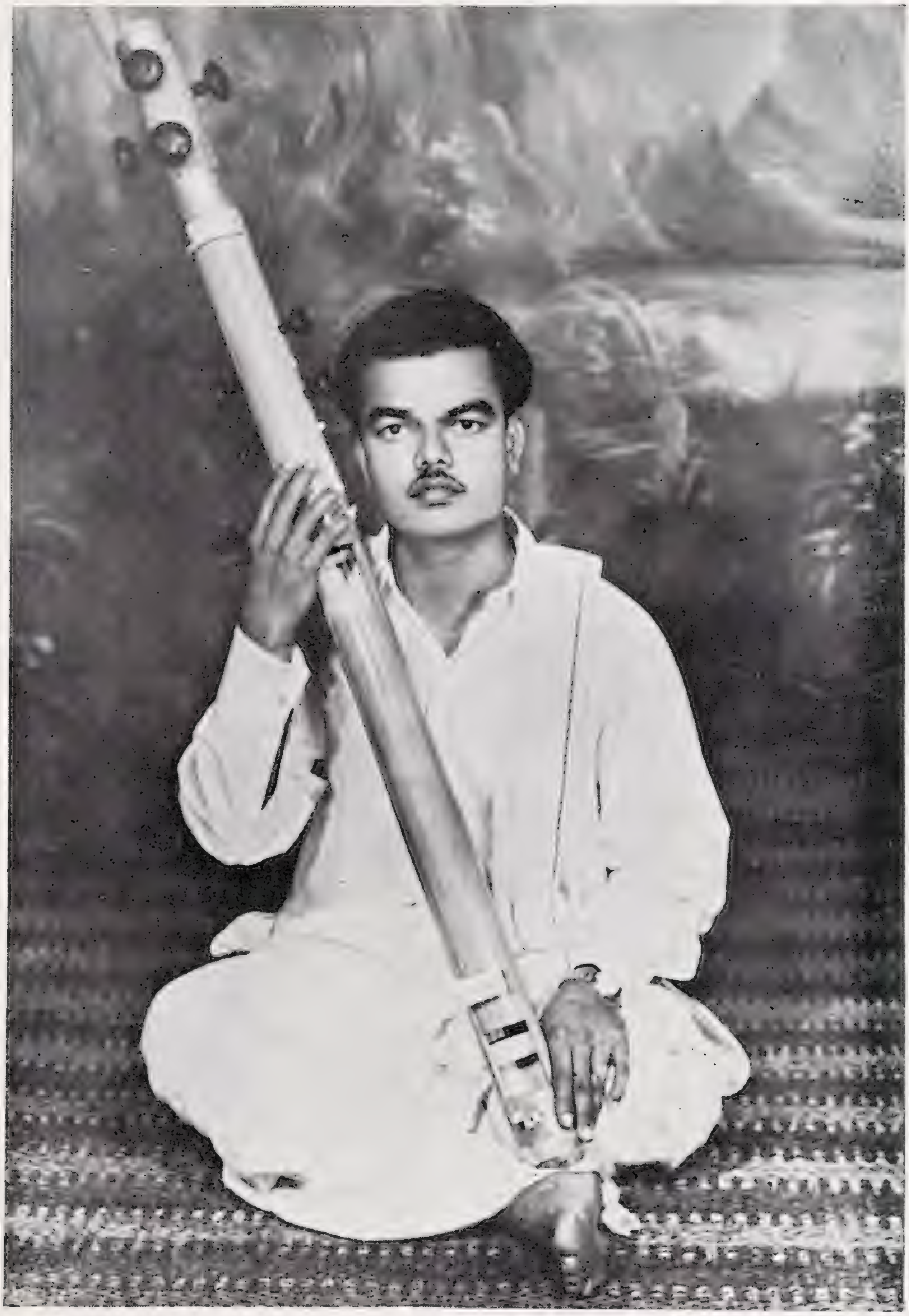

Plate 11. Sur sota in the playing posture

Plate 12. Ektar

Plate 13. Ektar in the playing posture

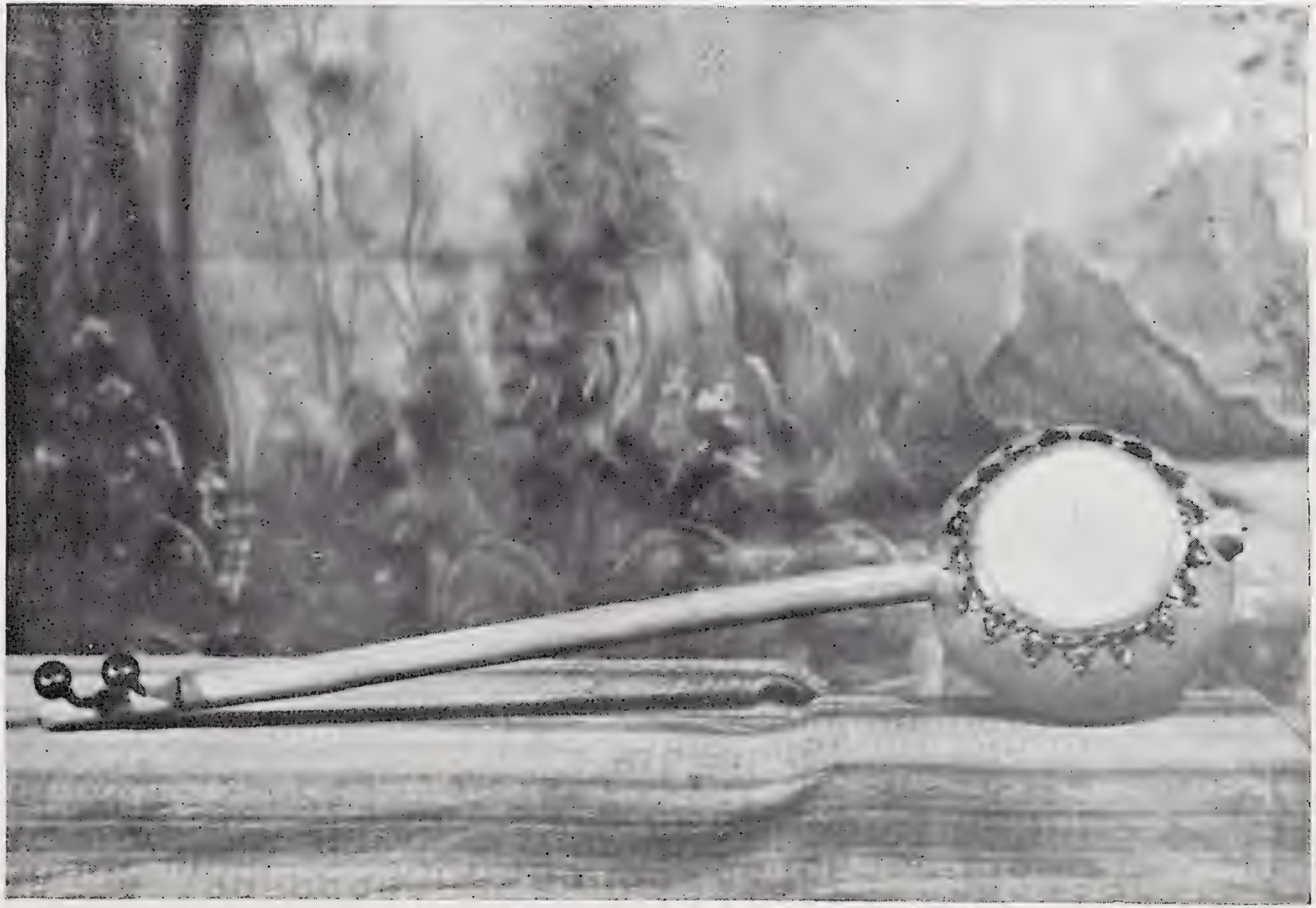

Plate 14. Dotar

Plate 15. Dotar in the playing posture.

Plate 16. Tuntina in the playing posture

Plate 17. Ottu

Plate 18. Ottu in the playing porture.

Plate 19. Tutti

Plate 20. Ottu sangu

Plate 21. NEDUNKUZHAL
in the playing posture.

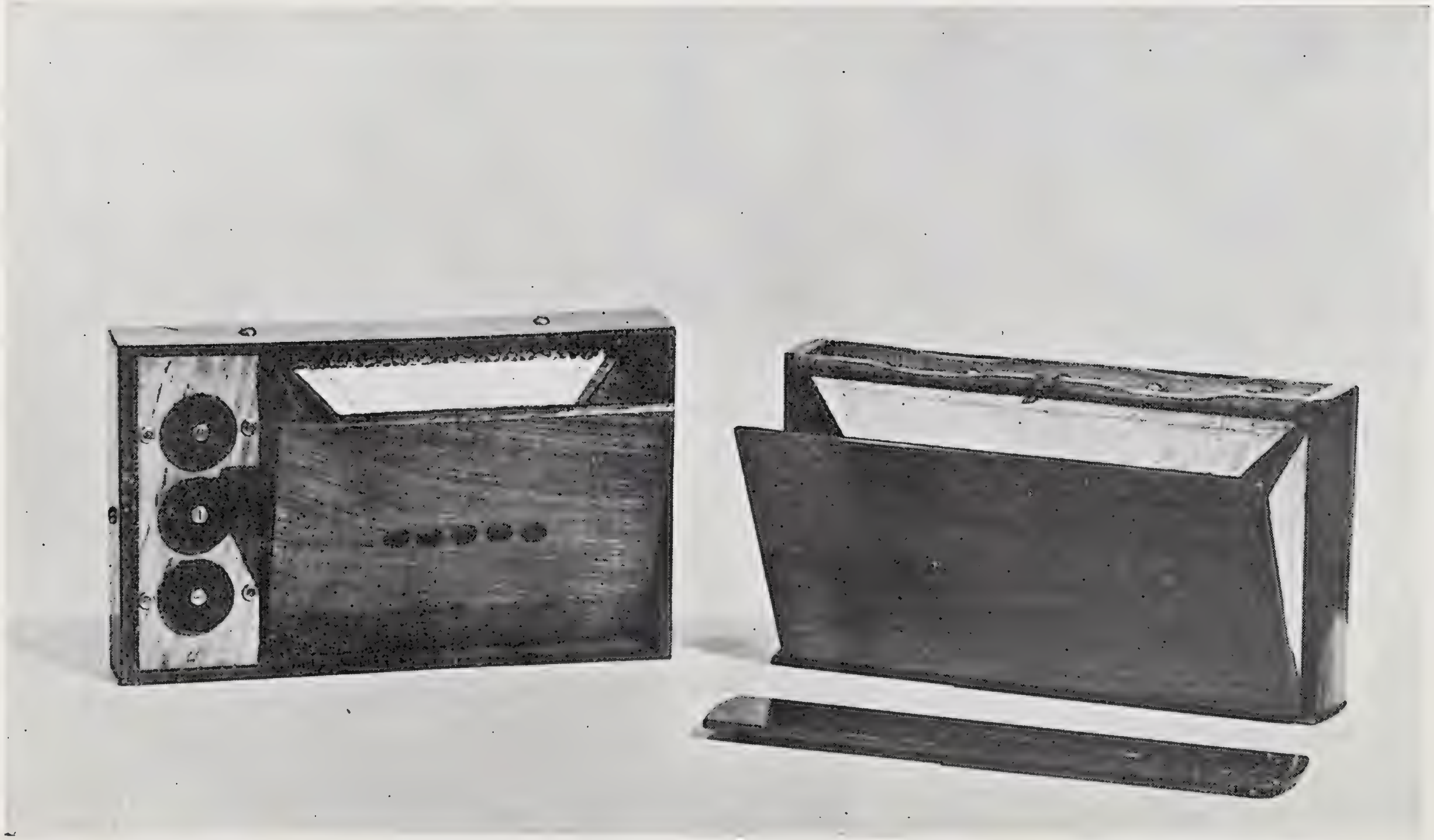

Plate 22. Two types of Sruthi box

Plate 23. Sruthi box in the playing posture

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